

Application No. 09/589,299

Filed: June 7, 2000

Group Art Unit: 2675

REMARKS

Claims 1-7, 9-11, 28-29, and 37 have been rejected under 35 U.S.C. § 103(a) over Amafuji et al. (US Pat. No. 6,292,158) in view of Rallison et al. (US Pat. No. 5,949,583).

Claim 1 recites a head-mountable support fixture comprising an elongated member having a first end and a second end. Claim 1 as amended clarifies that the projection system is attached at the first end of the elongated member of the support fixture and that the eyepiece assembly is attached to the second end of the elongated member of the support fixture.

Amafuji discloses a display system incorporating an off-axis optical system. The Examiner cites Rallison as disclosing an on-axis or axial system and asserts that it would be obvious to combine the on-axis or axial system of Rallison with Amafuji.

However, even if this asserted combination were made, it would not result in the presently claimed invention in which a projection system is attached at a first end of an elongated member of a support fixture and that an eyepiece assembly is attached to a second end of the elongated member of the support fixture. The Rallison axial system does not employ an elongated member having a projection system attached at one end and an eyepiece assembly attached at an opposite end.

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More particularly, Rallison discloses an image generator 2 mounted in a visor arrangement to extend outwardly from the forehead area of the wearer. See Figs. 3 and 4. An optical path 6 from the image generator extends downwardly to a fold mirror 1 and outwardly to a reflective combiner 4, where it is then reflected back toward the eye. The image generator 2 is not attached at one end of an elongated member, and the optics (fold mirror 1 and combiner 4) are not attached at an opposite end of an elongated member. Thus, Rallison does not disclose, teach, or suggest this recitation of claim 1.

Furthermore, Amafuji discloses an embodiment in Fig. 3 that is more like the visor arrangement of Rallison. Thus, if Rallison were to be combined with Amafuji for purposes of providing an axial system to minimize aberrations (the motivation suggested by the Examiner), the Rallison optical system would most likely be employed in the visor arrangement of Amafuji's Fig. 3. One of skill in the art would not try to rearrange the optical components of Rallison to place the image generator on one end of an elongated member and the optical components on the other end or to fit these components into the embodiment of Amafuji's Fig. 5, which is mounted on the side of the user's head. There is no teaching in Amafuji or Rallison as to how one of skill in the art

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would modify the Fig. 5 embodiment of Amafuji into an axial system. In any event, substantial reconstruction would be required to do so.

Accordingly, claim 1 and the claims dependent therefrom are believed to be patentable over Amafuji in view of Rallison.

Claim 8 has been rejected under 103(a) over Amafuji and Rallison and in view of Taniguchi et al. (US Pat. No. 6,023,253). This claim is believed to be patentable for the reasons set forth with respect to claim 1 and no further comment thereon is believed necessary at this time.

Claim 12 has been rejected under § 103(a) over Amafuji and Rallison and in view of Ronzani et al. (US Pat. No. 5,844,656). This claim is believed to be patentable for the reasons set forth with respect to claim 1 and no further comment thereon is believed necessary at this time.

Claims 13-15, 19, 28, and 41 have been rejected under § 103(a) over Amafuji and Rallison and in view of Ronzani and further in view of Handschy. Ronzani has been cited (in the rejection of dependent claim 12) for disclosing a HMD display in which the eyepiece assembly is "hollow and spherical and therefore curved." Handschy has been cited for disclosing an assembly for producing a visual image, in which the assembly uses a cube that

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is transparent. The Examiner asserts that it would be obvious to combine the transparent cube or assembly of Handschy with the eyepiece assembly of Amafuji, Rallison and Ronzani.

Ronzani does not disclose a spherical eyepiece assembly. As is apparent from Figs. 1-9 of Ronzani (cited by the Examiner), Ronzani discloses an eyepiece or cell 3 that is housed in a cylindrical housing. Presumably there are optical elements within the eyepiece or cell 3. Ronzani, however, provides no disclosure, teaching, or suggestion as to the nature or configuration of any such optical elements within the cylindrical housing. Accordingly, Ronzani does not disclose, teach, or suggest a spherical, hollow eyepiece housing, as presently claimed. Thus, claim 13 and the claims dependent therefrom are believed to be patentable thereover.

Furthermore, Handschy has been cited for teaching a transparent cube for combination with the eyepiece assembly of Amafuji, Rallison, and Ronzani. Claim 13 recites an eyepiece assembly disposed within a hollow, transparent, spherical housing. Thus, presumably, the Examiner is relying on Handschy to teach a transparent housing. However, Handschy discloses a transparent polarizing beam splitter cube 48, not a transparent housing. The disclosed transparent polarizing beam splitter cube 48 is part of

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an optics arrangement 40 that is further employed in conjunction with other components, such as an illumination arrangement 34 and spatial light modulator 36. (See Figs. 2A-C, 3A-E, and 4.) Handschy provides no disclosure or teaching as to the manner of housing or otherwise supporting the optics arrangement 40 and the other components. Accordingly, Handschy provides no teaching that can be combined with Amafuji, Rallison, and Ronzani to arrive at the presently claimed hollow, transparent, spherical housing. Claim 13 and the claims dependent therefrom are believed to be patentable thereover for this reason as well.

Furthermore, the four different eyepiece assemblies disclosed in the four different references (Amafuji, Rallison, Ronzani, and Handschy) provide such a disparate variety of eyepiece assemblies, that it would not be obvious for one of skill in the art to come up with the presently claimed a hollow, transparent, spherical housing, even relying on the motivations asserted by the Examiner. Thus, claim 13 and the claims dependent therefrom are believed to be patentable over Amafuji in view of Rallison, Ronzani, and Handschy.

Claims 16-18 and 20 have been rejected under § 103(a) over Amafuji, Rallison, Ronzani and Handschy and further in view of Fan et al. (US Pat. No. 5,815,126). These claims are believed to be

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patentable for the reasons set forth with respect to claim 13 and no further comment thereon is believed necessary at this time.

Claims 21-22, 24, 28, and 43 have been rejected under § 103(a) over Amafuji and Rallison in view of Carollo (US Pat. No. 6,144,439). In the "Response to Arguments" section, regarding Carollo, it appears that the Examiner is considering the externally concave surface of the meniscus lens 220 to be an "internal reflective surface." Independent claim 21 as amended clarifies that the recited internal reflective surface reflects light that is within or internal to the solid optical material. In contrast, the concave surface of the meniscus lens 220 of Carollo reflects light external to the lens. See, e.g., Fig. 2. Accordingly, claim 21 and the claims dependent therefrom are believed to be patentable over Amafuji and Rallison in view of Carollo.

Claim 23 and 25 are rejected under § 103(a) over Amafuji, Rallison and Carollo and further in view of Takahashi (US Pat. No. 5,701,202). These claims are believed to be patentable for the reasons set forth with respect to claim 21 and no further comment thereon is believed necessary at this time.

Claims 26-27 have been rejected under § 103(a) over Amafuji, Rallison and Carollo and further in view of Ronzani. These claims

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are believed to be patentable for the reasons set forth with respect to claim 21 and no further comment thereon is believed necessary at this time.

Claims 30-32 have been rejected under § 103(a) over Amafuji, Rallison, Ronzani, Handschy, and Carollo and in view of Lebby et al. (US Pat. No. 5,469,185). These claims are believed to be patentable for the reasons set forth with respect to claims 1, 13, or 21 and no further comment thereon is believed necessary at this time.

Claims 33-35 have been rejected under § 103(a) over Amafuji, Rallison, Ronzani, Handschy and Carollo and in view of Fan. These claims are believed to be patentable for the reasons set forth with respect to claims 1, 13, or 21 and no further comment thereon is believed necessary at this time.

Claim 36 has been rejected under § 103(a) over Amafuji and Rallison and in view of Newman et al. (US Pat. No. 5,844,824). This claim is believed to be patentable for the reasons set forth with respect to claim 1 and no further comment thereon is believed necessary at this time.

Claim 38 has been rejected under § 103(a) over Amafuji and Rallison and in view of Horiuchi (US Pat. No. 6,304,234). This claim is believed to be patentable for the reasons set forth with

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respect to claim 1 and no further comment thereon is believed necessary at this time.

Claim 39 has been rejected under § 103(a) over Amafuji, Rallison, Ronzani and Handschy and in view of Newman et al. This claim is believed to be patentable for the reasons set forth with respect to claim 13 and no further comment thereon is believed necessary at this time.

Claim 41 has been rejected under § 103(a) over Amafuji, Rallison, Ronzani, and Handschy and in view of Horiuchi. This claim is believed to be patentable for the reasons set forth with respect to claim 13 and no further comment thereon is believed necessary at this time.

Claim 42 has been rejected under § 103(a) over Amafuji, Rallison and Carollo and in view of Newman. This claim is believed to be patentable for the reasons set forth with respect to claim 21 and no further comment thereon is believed necessary at this time.

Claim 44 has been rejected under § 103(a) over Amafuji, Rallison and Carollo and in view of Horiuchi. This claim is believed to be patentable for the reasons set forth with respect to claim 21 and no further comment thereon is believed necessary at this time.



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Claims 14-20 have been rejected under § 112, second paragraph. Independent claim 13 has been amended to recite a "curved" housing to provide antecedent basis for that term in claims 14-20. Accordingly, this rejection is believed to be overcome.

In view of the above amendments and remarks, Applicant submits that all claims are in condition for allowance, and reconsideration and indication thereof are respectfully requested. The Examiner is encouraged to telephone the undersigned attorney to discuss any matter that would expedite prosecution of the present application.

Respectfully submitted,

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